

To: Jessop, Carter[JESSOP.CARTER@EPA.GOV]
From: Goldmann, Elizabeth
Sent: Sat 2/22/2014 12:38:49 AM
Subject: secondary impacts

Let me know if you need more.....this was taken from our 11/7/13 ltr

Secondary Impacts

EPA's Guidelines (40 CFR 230.11(h)) and the 2008 Mitigation Rule (40 CFR 230.93) clearly state the need to compensate for losses of waters due to secondary impacts. The requirement that secondary impacts be fully compensated is consistent with standard practice for projects of this magnitude and essential given that the range, extent and severity of secondary adverse impacts upon aquatic resources are no less significant than the direct impacts.

Secondary impacts have not been fully assessed for the proposed project. As described below, secondary impacts: 1) upstream of the mine; 2) downstream of the mine beyond the confluence of Davidson Canyon and Cienega Creek; and 3) secondary impacts from groundwater drawdown resulting in detrimental effects to the surface flows in several streams, springs and wetlands have not been analyzed as required under the Guidelines.

Lost Functions to Waters Upstream of Mine - As discussed above, the project site supports 101.6 acres of waters of which 39.97 acres will be directly impacted. The remaining 62 acres of waters on the project site will likely be indirectly impacted. We understand that some of these indirect impacts have been accounted for, above, as part of the assessment of indirect impacts from reduced stormwater flows in Barrel and Davidson Canyons within the project area downstream from the proposed mine. However, there will be indirect impacts to drainages upstream from the mine. These impacts may include changes to hydrology, decreased quality of wildlife habitat, and fragmentation of animal movement corridors. We believe that indirect impacts to waters that lie upstream from the mine site need to be quantified and mitigated.

Reductions in Surface Water Flow Downstream of the Mine - At the request of the Corps, Rosemont estimated indirect impacts to jurisdictional waters in Barrel and

Davidson canyons downstream from the proposed mine due to modeled reductions in surface water volume resulting from the Rosemont Project.^[1] Indirect impacts to downstream waters were estimated at 28.4 acres during mine operation. EPA questions why the estimates of indirect impacts to waters downstream from the mine site did not include the reach of Cienega Creek from its confluence with Davidson Canyon downstream to Pantano Dam. Certainly, reductions in surface water flow volume have the potential to adversely affect waters, including wetlands, in Cienega Creek downstream from the confluence of Davidson Canyon. These impacts are likely to be significant, especially given the cumulative effects of predicted reductions in groundwater levels from the proposed mine pit. Therefore, we believe that estimates of indirect impacts from reductions in surface water flow volume should be extended downstream along Cienega Creek to Pantano Dam.

Groundwater Drawdown - Secondary effects on the aquatic environment include dramatic and persistent changes to hydrologic and hydraulic regimes within the project area and adjoining watershed, adversely affecting the function of sensitive and regionally significant downstream receiving waters, including Outstanding Arizona Waters. Secondary impacts from project-related groundwater drawdown will reduce streamflows^[2], increase water temperatures, and disrupt breeding, spawning, rearing and migratory movements, or other critically life history requirements of fish and wildlife resources.

Eleven springs are highly likely to be indirectly impacted due to groundwater drawdown. An additional fifty-nine springs may be indirectly impacted due to drawdown. An additional 13 riparian areas associated with springs would be directly or indirectly disturbed with high certainty and an additional 36 riparian areas associated with springs may be indirectly disturbed.

The proposed project is likely to have secondary significant impacts to downstream reaches of Davidson Canyon, Empire Gulch, Gardner Canyon, Cienega Creek, and other nearby waters. Modification to the water balance along portions of Davidson Canyon, Empire Gulch, Gardner Canyon and Cienega Creek will adversely impact special aquatic sites. The project mine will change in perpetuity the hydrologic regime of the mine site from a water source area to a terminal sink by constructing a mine pit 2,900 in depth. The pit will significantly lower the surrounding regional aquifer. The pit will permanently reverse the natural direction of groundwater flow toward and into the mine pit, and away from the sensitive aquatic habitats in Las Cienegas National Conservation Area and Cienega Creek Natural Preserve. This will cause a persistent, permanent and additive drawdown of water in streams and wetlands along Empire Gulch, Mattie Canyon, Gardner Canyon and Cienega Creek with potential adverse

impacts to over 30 seasonal and perennial wetlands, and threatened and endangered aquatic habitat dependent plants, fish and wildlife.

Groundwater drawdown will result in stress and mortality to riparian habitat, including wetlands. The USFS estimates that indirect effects from the proposed mine project will change the composition of 1,071 acres of riparian vegetation along Empire Gulch (*i.e.*, 407 acres of hydriparian) and Barrel and Davidson canyons.^[3] Several additional springs, seeps, streams, emergent marshes, and riparian areas within the project assessment area likely contain jurisdictional waters, including wetlands, which will be indirectly impacted by the proposed project, primarily from groundwater drawdown.^[4]

To date, the geographic extent of potentially jurisdictional waters along Empire Gulch, Gardner Canyon, Cienega Creek, and the other noted waters, have not been determined and therefore secondary impacts to any jurisdictional waters have not been quantified. Based on a field inspection conducted by EPA, BLM and Pima County staff during June 2013, we believe that that tens to hundreds of acres of jurisdictional waters/wetlands are present within the assessment area that will be indirectly impacted by groundwater drawdown.

[1] Email from Brian Lindenlaub, Westland Resources to Elizabeth Goldmann, EPA, dated August 16, 2013.

2 The U.S. Forest Service (USFS) estimates that following closure the mine pit will result in the annual loss of 35-127 acre-feet of mountain-front groundwater recharge in perpetuity. During the period of active mining, total dewatering loss from mine pit operation will be 18,000-26,000 acre-feet, or about 900-1300 acre-feet annually. This is a significant loss of recharge to the groundwater aquifer. Following mine closure the pit lake will in perpetuity divert, capture and evaporate natural groundwater flows that would otherwise replenish sensitive downstream receiving waters (PAFEIS, July 2013, Chapter 3, *Alternatives, Including the Proposed Action*; Comment Letter from Pima County to U.S. Forest Service on PAFEIS, dated August 14, 2013).

3 PAFEIS, July 2013, Chapter 3, *Seeps, Springs and Riparian Areas*

4For example, the PAFEIS states that for Empire Gulch and Cienega Creek all three groundwater models predict near- and long-term stream flow drawdown along Upper Cienega Creek. Comparing these projected model drawdowns with minimum monthly stream flows (2001-2010 period of record) for Upper Cienega Creek indicates that the predicted drawdown would cause the stream to go dry during critical low flow months (Chapter 3, Figure 70). The PAFEIS further concludes that a small change in stream flow could result in the loss of surface flow during these drought periods (PAFEIS, Chapter 3, *Seeps, Springs and Riparian Areas*). In addition, the PAFEIS states that Upper Cienega Creek receives surface water [and groundwater] flow from Empire Gulch and the potential exists for a reduction in Empire Gulch stream flow to result in reductions in Cienega Creek's stream flow as well. Small amounts of groundwater drawdown could affect near-and long-term stream flow in Empire Gulch and Cienega Creek and that hydrologic changes predicted for Empire Gulch from drawdown could have a potential effect on springs and stream flow, potentially shifting some or all of the stream length from perennial to intermittent (PAFEIS, July 2013, Chapter 3, *Seeps, Springs and Riparian Areas*). Pima County, as well as the BLM which manages the NCA, have expressed similar concerns regarding the secondary effects to Empire Gulch and Cienega Creek surface waters from groundwater drawdown (Comments submitted to the Forest Service by Pima County and BLM on the PAFEIS, dated August 14, 2013). In addition, secondary impacts to intermittent surface flows are likely to occur in Box Canyon, Sycamore Canyon, Adobe Tank Wash, and Mulberry Canyon which all lie within the modeled 5-foot drawdown area

(Comments submitted to the Forest Service by Pima County on the PAFEIS, dated August 14, 2013).

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